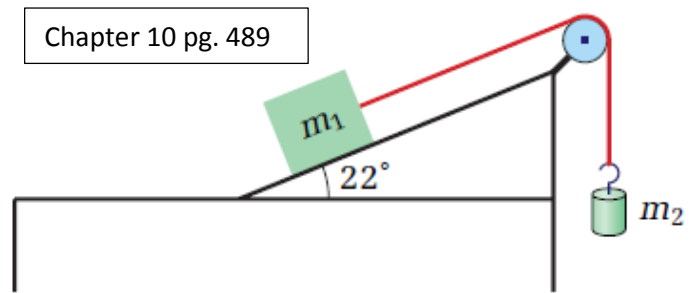


Forces on an Incline Plane – Extra Practice

- A 33 kg block is sliding down a 35° incline. The coefficient of kinetic friction is 0.13.
 - Calculate the applied force up the ramp necessary so the block accelerates with a magnitude of 0.75 m/s^2 down the ramp.
 - Recalculate to determine the applied force required to accelerate the block up the ramp at 0.75 m/s^2 .
- A 25 kg box is placed on a 33° incline. The coefficient of kinetic friction is 0.38. Calculate the acceleration of the box. (2.2 m/s^2 down the ramp)
- An inclined ramp is to be used to slide down an object at a constant velocity. The coefficient of kinetic friction is 0.38. Calculate the angle required for this to happen.
- A counterweight is used to slide an object up an inclined plane that makes a 42° angle with the horizontal. The counterweight has a mass of 40 kg and is suspended with a massless string and a friction less pulley. The coefficient of kinetic friction on the plane is 0.33. For the acceleration of the object not to exceed 0.22 m/s^2 up the ramp, what must be the minimum mass of the object?
- A counterweight is used to slide an object up an inclined plane of 20° . The counterweight has a mass of 25 kg and is suspended with a massless string and a friction less pulley. The coefficient of friction on the plane is 0.19. What is the acceleration of a 16 kg object?

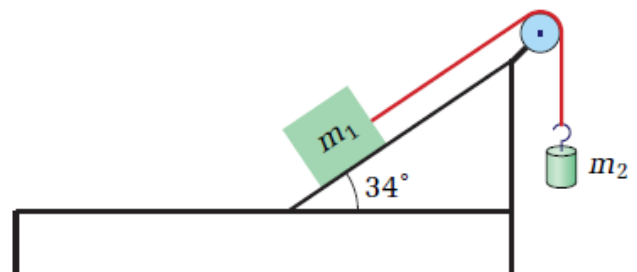
27. The block in the diagram has a mass of 145 g and the freely hanging object has a mass of 85 g. The coefficient of kinetic friction between the block and the ramp is 0.18. The ramp makes an angle of 22° with the horizontal.

- What will be the speed of the masses 2.5 s after they just start to move?
- What is the tension in the string while they are moving?



28. The block in the diagram has a mass of 725 g, and the hanging object has a mass of 595 g. The coefficient of static friction between the block and the inclined plane is 0.47, and the coefficient of kinetic friction is 0.12. The inclined plane makes an angle of 34° with the horizontal.

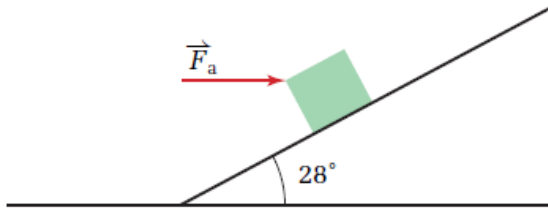
- What force directed up the incline would you have to apply to the block, to make the objects start to move?
- After the objects start to move, what will be their acceleration?
- What will be the tension in the string when the objects are moving?



Forces on an Incline Plane – Extra Practice

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11. A 61 kg plastic container sits on a ramp.
- (a) If the coefficient of static friction is 0.37, at what angle of the ramp would the container just start to slide?
13. A new worker in a warehouse is pushing an 85 kg crate up a 28° ramp. The coefficient of static friction is 0.46. Instead of pushing directly up the ramp, the worker is pushing directly horizontally as shown in the diagram.



- (b) If the coefficient of kinetic friction is 0.18, what would be the acceleration of the container just after it started to slide?
- (a) How hard does the worker have to push to start the crate moving up the ramp? (Hint: A component of the applied force is perpendicular to the ramp thus increasing the normal force.)
- (b) An experienced worker stops and tells the new worker to kneel down a little and push directly up the ramp. How hard does the worker have to push to start the crate moving up the ramp from this position?